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published in

Lecture Notes in Computer Science
2011

DOI (link to publisher)

[10.1007/978-3-642-24500-8_2](https://doi.org/10.1007/978-3-642-24500-8_2)

document version

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

citation for published version (APA)

Roth, C., Klimmt, C., Vermeulen, I. E., & Vorderer, P. A. (2011). The experience of Interactive Storytelling: Comparing „Fahrenheit“ with „Facade“. *Lecture Notes in Computer Science*, 6972, 13-21.
https://doi.org/10.1007/978-3-642-24500-8_2

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The Experience of Interactive Storytelling: Comparing “Fahrenheit” with “Façade”

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Abstract. At the intersection of multimedia, artificial intelligence, and gaming technology, new visions of future entertainment media arise that approximate the “Holodeck” ® idea of interactive storytelling. We report exploratory experiments on the user experience in a ‘classic’, foundational application of interactive storytelling, “Façade” (Mateas & Stern, 2002), and compare results with an identical experiment carried out with users of the adventure game “Fahrenheit”. A total of $N = 148$ participants used one of the systems interactively or watched a pre-recorded video sequence of the application without interactive involvement. Using a broad range of entertainment-related measures, the experience of Interactive Storytelling was found to depend strongly on interactivity (mostly in “Façade”) and to differ substantially across the systems, with “Façade” achieving a stronger connection between interactive use and the resulting profile of entertainment experiences.

Keywords: Interactive storytelling, user experience, “Façade”, enjoyment, adventure games.

1 Introduction

Research and development on Interactive Storytelling (IS) is about to bring out systems and media that provide novel modes of entertainment, learning, and other experiences [1]. Departing from existing media, such as adventure video games, and synthesizing diverse streams of technology, including as artificial intelligence, 3D real-time imaging and/or speech recognition, the vision of Interactive Storytelling is to facilitate user experiences that combine immersion in fictional stories with perceptions of agency and the situation dynamics of improvisation theatre. Conceptually, IS emerges as one pathway towards next generation entertainment computing [2]. So far, various demonstrators have been developed that illustrate how this vision of new entertainment media could be implemented technically in the future (e.g., the “Façade” system [3] or the “Madam Bovary” system [1]).

But audiences are going to perceive, use, and adopt such (radically) new media remains an open question [4]. How using such media will ‘feel like’, which qualities of enjoyment Interactive Storytelling can facilitate is not well understood, which is due to both a lack of theoretical-psychological reasoning and of empirical exploration. In addition to fundamental scientific knowledge gaps, not much is known from an applied and commercial perspective either. The acceptance of future IS systems by lay audiences and their market success will certainly depend on whether they achieve the satisfaction of target audience expectations and meet user capabilities as well as emotional preferences. It is therefore important to consider psychological perspectives on how users respond to current IS systems in order to advance basic research in media entertainment and entertainment computing and at the same time to ground design decisions and future technology developments for user acceptance and economic success. Moreover, social research and user responses to IS prototypes can build bridges between technology-driven research on new media systems and social science perspectives on media entertainment, learning, and other domains. The present paper thus addresses the question which kind of entertainment experiences users find – and do not find – in Interactive Storytelling.

2 Conceptual Background: Mixing Interactivity and Narrative

Modelling user experiences in IS exposure turns out to be a theoretical challenge [4]. Because IS systems share similarities with a wide array of conventional and new media entertainment [5], the list of construals from media psychology that could emerge as relevant dimensions of the IS user experience is remarkably long. In general, existing approaches to media entertainment offer (A) well-established psychological accounts of emotional responses to non-interactive stories, such as novels or movies [6] and (B) more recent propositions of interactive media enjoyment, mostly related to the video game experience [7]. Similarly, in the game studies community, theoretical propositions have been advanced that root in ‘narratology’ and consider what interactivity might ‘do’ to conventional story experiences, or are based in ‘ludology’ and consider what mediated narratives might ‘do’ to conventional play experiences [8].

The key conclusion from this diverse literature base is that there is probably not ‘the one’ kind of (radically new) user experience one should expect from IS usage. Rather, quite different types of user experience, such as suspense or exhilaration, may emerge from specific characteristics of given applications [9]. So a theoretical forecast of what the user experience of IS might be is inevitably vague and in need of elaboration.

Roth et al. [10] and Klimmt et al. [11] conducted a theoretical analysis and expert interviews with creators of IS applications to come up with a dimensional framework of the most important and most likely dimensions of the user experience in IS. According to their findings, multimedia Interactive Storytelling will be capable to foster the following psychological processes and states that are linked to enjoyment. First, this conceptual work identified five important preconditions of meaningful user experiences:

- System usability, (i.e., the experience that the interaction with the story is fluent, smooth, and error-free)
- Correspondence of system capabilities with user expectations (i.e., the experience that the system makes realistic offers about how users can influence the story and then keeps its promise so that frustration is avoided)
- Presence, (users establish a sense of ‘being in the story world’)
- Character believability (virtual agents in the story world contribute to a coherent story experience and do not damage users’ illusion, e.g., through ‘intelligent’ behavior and predictable response to user input), and
- Effectance [12] (i.e., users can easily recognize when and how they have causally affected the story or story world).

Next, the conceptual framework includes five types of key user responses that reflect ‘typical’, common patterns which are likely to occur across different IS systems):

- Curiosity, (users maintain interest in what will happen next and how they could affect the story)
- Suspense (users develop hopes and expectations about the story progress, but also face uncertainty about that progress)
- Flow (users become absorbed in ongoing, continuous interaction with the story world)
- Aesthetic Pleasantness, (positive experiences of beauty or artistic impressiveness)
- Enjoyment (an overall sense of positively valenced experiential quality)

Finally, the model of the IS user experience includes elements that emphasize the unique characteristics of each IS application, such as the specific story content that may facilitate very diverse emotional experiences or the virtual characters that may evoke very specific user responses. Therefore, users overall emotional condition (as reflected in a specific affect model [13] and the degree of identification with the story’s protagonist were proposed as system-specific user reactions.

Overall, the theoretical model comprises 12 dimensions of user responses that the authors identified as meaningful and important across ‘any’ type of interactive story. They reflect the commonalities of IS applications with conventional (and interactive) entertainment media. With this theoretical framework, a foundation was created that allows exploring actual user experiences to interactive stories empirically. Exploratory experiments were conducted to find out which of the theorized facets of the user experience may turn out as important so that conceptual and design-related conclusions can be drawn.

3 Research Design

In order to explore user responses to IS applications, the concepts identified by Roth et al. and Klimmt et al. were transformed into self-report measures that could be administered immediately after exposure to an IS system [14]. With this user experience questionnaire, we examined audience reactions to two applications of IS: One was a commercial adventure video game that featured some elements of interactive storytelling, “Façade” (Atari, 2005), the other was the ‘classic’ prototype

demonstrator of dialogue-based, ‘true’ IS that is widely cited in the IS research and development community, “Façade” [3]. “Fahrenheit” is an audiovisually advanced type of story with pre-scripted narrative and relatively few degrees of freedom for users decisions. Its setting borrows from classic crime and mystery thriller plots and puts the player into the role of an amnesic murder suspect. “Façade” is audiovisually less impressive, but employs a dialogue-based interface and thus opens considerable more levels of user impact on the progress of story events (see figure 1). Its setting is more similar to TV series contexts that focus on interpersonal relationships and personalities of individual characters.

The comparison of user experiences to both systems was intended to reveal system-bound profiles of users’ entertainment experiences. Moreover, an experimental approach was implemented so that participants either used the system interactively (and thus shaped the progress of the story by themselves) or merely watched a pre-recorded video of what happened in the story when somebody else had interacted with the system (non-interactive control condition). This way, the impact of adding interactivity to the story on users responses was examined across two different IS applications.



Fig. 1. Screenshots from “Fahrenheit” (Atari, 2005) and “Façade”

In the “Fahrenheit” experiment, $N = 80$ university students (22 males, 58 females; average age $M = 20.08$ years, $SD=1.91$ years) with a relatively low degree of computer game literacy ($M=1.60$, $SD=.84$ on a scale from 1-3) were recruited. Exposure time in the interactive and the non-interactive conditions was about 30 minutes. The recruited students were randomly assigned to the interactive or the non-interactive group. After exposure to “Fahrenheit”, participants were kindly requested to fill in a computer-based questionnaire that included the 12 scales on user reactions to IS systems, as well as some demographics items. Some participants received credits for a course they were attending, others received 10 Euros for their participation in the experiment (see [14] for more details).

A total of $N = 68$ university students (22 males, 44 females; average age $M = 20.74$ years, $SD=5.33$ years) with a relatively low degree of computer game literacy ($M=1.54$, $SD=.74$ on a scale from 1-3) participated in the “Façade” experiment. They were randomly assigned to either the interactive (normal play) condition, or to the non-interactive (pre-recorded sequence) condition. After 30 minutes of exposure, they filled out the computer-based questionnaire. Like in the “Fahrenheit” study, some participants received credits for a course they were attending, others received 10 Euros for their participation in the experiment. The overall procedure typically lasted for about 50 minutes. Therefore, the experimental set-up and procedures were virtually identical for

the “Fahrenheit” game and the “Façade” prototype, which maximized the comparability of user experiences. In both parts of the study, self-report scales reached satisfying reliabilities (with very few exceptions Cronbach’s Alphas > .80).

4 Results

Data analysis was conducted separately for users of the different systems in order to follow experimental procedures (interactivity had been manipulated, whereas the comparison of two quite different games/systems is not strictly experimental). Tables 1 and 2 display the group means for “Fahrenheit” and “Façade” users in the interactive and non-interactive conditions, as well as significance tests for differences between interactive system use and the non-interactive ‘watching’ condition.

Interestingly, for “Fahrenheit” the addition of interactivity did not shift user reactions on very many dimensions of experience. Curiosity, suspense, aesthetic pleasantness and even the flow experience (which is commonly theorized to be bound to interactivity) were not observed to differ between interactive users and ‘passive watchers’. Overall enjoyment did also not differ significantly between the groups. However, the manipulation of interactivity caused reduced perceptions of usability, a higher correspondence with expectations, lower levels of perceived character believability, and substantially higher levels of efficacy (effectance). So users who interacted with the “Fahrenheit” story perceived their causal influence on the game world more clearly when they interacted with the system, but at the same time found more usability problems compared to ‘passive watchers’ who did of course not face any usability issues at all. Results are thus interpretable, but the key finding is that the entertainment experience of the “Fahrenheit” story did not shift drastically – that is, across many theorized dimensions – if interactivity was added or removed.

Table 1. Results from the study on “Fahrenheit”. Scale means (*M*) were obtained by averaging participant responses to five-point rating items.

User experiences	Interactive condition		Non-interactive condition		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
System usability	3.11	.94	3.69	.75	.004*
Correspondence /w user expectations	3.63	.56	3.38	.62	.06†
Presence	2.68	.98	2.62	.95	.77
Character believability	2.98	.90	3.48	.59	.004*
Effectance	3.23	.69	2.40	.97	.000*
Curiosity	3.58	.73	3.43	.64	.35
Suspense	3.33	.72	3.44	.77	.51
Flow	2.95	.71	3.00	.49	.70
Aesthetic pleasantness	2.00	.65	2.24	.62	.10
Enjoyment	2.94	.82	2.80	.66	.41
Emotional state: positive	4.60	1.66	4.51	1.50	.79
Emotional state: negative	2.59	1.51	2.91	1.43	.33
Role adoption	2.71	1.04	2.67	1.05	.86

Table 2. Results from the study on “Façade”. Scale means (*M*) were obtained by averaging participant responses to five-point rating items.

User experiences	Interactive Condition		Non-interactive condition		<i>P</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
System usability	3.93	.81	3.81	.68	.53
Correspondence /w user expectations	3.46	.61	3.10	.66	.025*
Presence	3.27	.84	2.77	1.00	.033*
Character believability	3.84	.63	3.64	.93	.32
Effectance	3.18	.92	2.47	.80	.001*
Curiosity	3.49	.62	3.33	.78	.33
Suspense	3.50	.68	3.33	.71	.32
Flow	3.00	.59	2.98	.61	.89
Aesthetic pleasantness	2.45	.80	2.54	.78	.67
Enjoyment	2.86	.73	2.54	.73	.07†
Emotional state:	5.07	1.31	4.31	1.53	.034*
positive					
negative	3.05	1.29	4.06	1.79	.011*
Role adoption	3.24	.80	2.88	1.02	.11

In contrast to “Fahrenheit”, the manipulation of interactivity changed users’ experience fundamentally in “Façade” users (table 2). While no difference in usability emerged (which suggests excellent technical usability in the Façade system), group differences were observed for satisfaction with expectations, Presence, effectance, enjoyment, and emotional states. In general, participants reported more favourable experiences in the interactive condition. Again, a strong impact of interactivity on effectance was observed. Thus, the variation of interactivity caused somewhat differing patterns in users’ experiences across the two examined systems.

5 Discussion

The exploratory experiment with the “Fahrenheit” adventure game and the “Façade” IS demonstrator revealed interesting findings. “Façade” was rated as substantially higher in usability in the interactive conditions than “Fahrenheit”. This mirrors important design differences between the applications, because “Fahrenheit” as an interactive movie or adventure game comes with much more complicated affordances for users when to interact and how to interact in given game/story situations than “Façade”. For users who are unfamiliar with the system, “Fahrenheit” thus causes inevitably greater difficulties to translate one’s intention into actual game events. “Façade”, in contrast, seems to provide a rather smooth, irritation-free way of interacting with the system and its characters.

Character believability ratings were also much higher in interactive “Façade” users than in interactive “Fahrenheit” users. This difference can be explained by the fact that “Façade” is much more focused on dialogue with characters within a limited plot

(a relationship argument between the protagonists Trip and Grace). In contrast, “Fahrenheit” contains a crime drama story with exceptional events (such as the protagonist finding a dead body under his hands) but less user-character dialogue, which may make the “Fahrenheit” personnel appear much less authentic. Presence was also higher among interactive “Façade” users than among interactive “Fahrenheit” players; interestingly, this finding occurred although “Fahrenheit” presents more elaborate graphics and sound. However, “Façade” puts the user in the midst of a dense interpersonal conflict, and the intensive story of “Façade” seems to afford higher levels of (social) Presence than the richer sensory experience of “Fahrenheit”. Finally, it is noteworthy that “Façade” created both more positive and more negative affect than “Fahrenheit”. This observation again reflects design differences of the two interactive stories examined, as “Façade” has been explicitly constructed to trigger uneasy feelings in users, but is on the other hand fun to use. In contrast, playing “Fahrenheit” does not trigger such a broad range of emotional responses.

While the comparison of the interactive users of the two different systems supports the argument that Interactive Storytelling is likely to facilitate various elements of enjoyment, depending on specific system properties, the examination of experimental interactivity effects across the two systems can help to derive further conceptual conclusions.

First, the most general impact of interactivity in Interactive Storytelling appears to address users’ perceptions of *efficacy* (effectance, [12]). In line with various conceptual approaches, the results indicate that in addition to ‘classic’ types of entertainment experiences, users of interactive stories recognize their causal agency within the environment, which adds an important element to the overall entertainment experience. The increased level of effectance as a consequence of added interactivity was observed across the two examined systems. However, further consequences of interactivity in interactive stories strongly differed between the systems, which suggests that the implementation of interactivity is closely bound to individual attributes, plot elements, and other design decisions of given applications.

The second observation that is constant across systems is that several enjoyment-related experiential components (such as curiosity, surprise, suspense) as well as enjoyment itself did *not* display substantial differences in interactive and non-interactive users. This finding calls for theoretical explanations that may also have an effect on how to envision user experiences with full-scale interactive stories of the future. Concerning the fact that the experimental manipulation of interactivity did not affect suspense, curiosity, and flow, one interpretation is that these types of enjoyment can be fueled by different assets of media content and form (such as audiovisual effects, appealing characters, or surprises in the plot [6]). So even if interactive user participation would influence suspense, curiosity, and flow, alternative factors could compensate so that, for example, suspense could be maintained high through affective bonds with believable characters also if interactivity ‘is removed’. Some modes of enjoyment could therefore be construed as ‘robust’ in the sense that if some of their causal determinants are unavailable, other determinants can still provide a satisfying level of fun.

Concerning the fact that curiosity, suspense, and flow did not differ across the two examined systems, one could argue that these experiential qualities of IS use do not depart from what is well-known in conventional entertainment. This would mean that curiosity, suspense, and flow emerge as those components of enjoyment that systems

of Interactive Storytelling will have in common with existing mainstream entertainment such as current video games or movies. In turn, these commonalities could mark an important link that helps users feel comfortable and have fun with the upcoming new types of entertainment media in the IS paradigm, as parts of the new experience will feel somewhat familiar. Clearly, further research on these ‘classic’ ingredients of entertainment experiences in the IS context is warranted.

Finally, an important result of comparing two quite different systems of Interactive Storytelling is that ‘switching interactivity on versus off’ caused a broader range of experiential changes in “Façade” users than in “Fahrenheit” users. Interactivity thus seems to play specific roles in the two systems, which suggests that more advanced types of IS (for which “Façade” is an example) can achieve a tighter integration of interactivity and storytelling so that more profound perceptual (Presence) and emotional effects result. If interactivity is closely connected to other elements of the experience, particularly those elements related to the narrative, an artificial switch-off of interactivity is likely to have profound impact on the user experience, as can be seen in table 2. In contrast, “Fahrenheit” has obviously achieved a less tight connection of interactivity with the remaining system elements, so that removing interactivity had only limited effects for the user experience. For “Façade” users, then, the interactive experience was ‘more different’ from the non-interactive version than for “Fahrenheit” users. This is proposed as empirical evidence for IS researchers’ understanding that advanced integration of user agency and narrative generation can indeed lead to innovative modes of entertainment experience [1] [4]. The present data suggest that this innovative experience is best characterized by strong immersion and affective dynamics (both positive and negative emotions), which may lead to very inspiring and long-lasting personal impressions.

Replications with even more sophisticated prototypes of interactive stories will show whether the integration of interactivity can make an even greater difference for the user experience than what we found with “Fahrenheit” versus “Façade”. The present studies have already shed some light on the theoretical challenges of understanding the user experience in Interactive Storytelling. They also demonstrate the importance of reflecting about the intended and actual qualities of enjoyment a given media application will facilitate in users. Because the profile of enjoyment will vary greatly among systems, there is not “the one” type of fun involved, nor is there one universal argument to convince users of the fun value of IS-based media experiences.

Acknowledgment. This research was funded by the European Commission (Network of Excellence “IRIS – Integrating Research on Interactive Storytelling” – FP7-ICT-231824). We thankfully acknowledge the Commission’s support.

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